US Army Corps of Engineers®
Engineer Research and Development Center

Improved Ship Simulation

Description

The CHL Ship/Tow Simulator (STS) is the modeling tool used by the Corps to define the horizontal requirements for most of our country's navigation channels. However, the six degree-of-freedom (6DOF) calculations were not developed for the accuracy required for vertical clearance design. The STS is limited in its real time calculations of ship 6DOF motions, vessel squat, wave directionality, and interaction in confined channels. Many algorithms in the CADET risk-based underkeel clearance package can be incorporated in the STS to improve its underkeel clearance predictions. In addition, a new program will be developed from existing software for predicting 6DOF motions for the STS. Finally, in confined channels with small underkeel clearance during turning maneuvers, the current effect on the ship can be up to 6 times greater than in deep-water. Thus, the modeling procedure will be improved to include the interactions between currents and water-surface elevations on the ship.

Issue

The Corps is under increasing pressure to provide ports and waterways that can accommodate a growing economy. The nation's existing navigation system cannot meet the projected trends in both traffic growth and vessel size. To both safely and economically meet these demands, it is imperative that the most accurate means of predicting channel depth and width is available. Existing channel design methodologies must be revised to incorporate more physics-based solutions. Accurate solutions of currents and depths in navigation channels will provide better representation of forces on a ship during transit and maneuvers and potentially reduced dredging costs.

Users

Corps Districts, shipping companies, pilot associations.

Products

The CHL Ship/Tow Simulator will more accurately simulate response to waves and currents in entrance channels.

Benefits

Better estimates of ship underkeel clearance and width requirements will result in dredging savings in entrance channels. Corps able to perform reliable risk-based analysis.

Corps Program

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Point of Contact

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